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U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEYS DOCKET NUMBER

18899.8

U.S. APPLICATION NO

10/018343

**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US).
CONCERNING A FILING UNDER 35 U.S.C. 371**

INTERNATIONAL APPLICATION NO.
PCT/EP00/05985

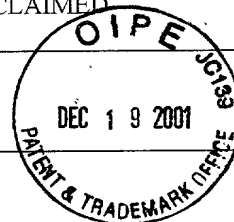
INTERNATIONAL FILING DATE
June 28, 2000

PRIORITY DATE CLAIMED
July 09, 1999

TITLE OF INVENTION: METHOD FOR THE PRODUCTION OF BRISTLES

APPLICANT(S) FOR DO/EO/US

WEIHRAUCH, Georg



Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information

1. ☒ This is a FIRST submission of items concerning a filing under 35 U.S.C. 371
2. ☐ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(I)
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C.371(c)(2)).
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C.371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C.371(c)(3)).
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C.371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C.371(c)(4)).
10. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C.371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:
 1. Form PCT/IB/308
 2. Return Postcard
 3. Conditional Petition to Revoke

10/078343

JC13 Rec'd PCT/PTO 19 DEC 2001
ATTORNEYS DOCKET NUMBER
18899.8

U.S. APPLICATION NO

INTERNATIONAL APPLICATION NO.
PCT/EP00/05985

17. The following fees are submitted:

CALCULATIONS PTO USC Only

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1)-(5)):

Search Report has been prepared by the EPO or JPO\$ 890.00

International preliminary examination fee paid to USPTO\$710.00

No international preliminary examination fee paid to USPTO
but international search fee paid to USPTO.....\$740.00Neither international preliminary examination fee nor
international search fee paid to USPTO.....\$1040.00International preliminary examination fee paid to USPTO
and all claims satisfied provisions of PCT Article 33(1)-(4).....\$100.00**ENTER APPROPRIATE BASIC FEE AMOUNT =**Surcharge of \$130.00 for furnishing the oath or declaration later than 20 30
months from the earliest claimed priority date (37 CFR 1.492(e))

CLAIMS NUMBER FILED NUMBER EXTRA RATE

Total claims 14 - 20 = 0 X \$ 18.00

Independent claims 1 - 3 = 0 X \$ 84.00

MULTIPLE DEPENDENT CLAIM(S) (if applicable) + \$ 280

TOTAL OF ABOVE CALCULATIONS =

Reduction by 1/2 for filing by small entity, if applicable

SUBTOTAL =Processing fee of \$130.00 for furnishing the English translation later than 20 30
months from the earliest claimed priority date + 130**TOTAL NATIONAL FEE =**Fee for recording the enclosed assignment (37 CFR 1.21(h)) The assignment must be
accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property**TOTAL FEES ENCLOSED =**Amount to be:
refunded \$
charged \$a. A check in the amount of \$ to cover the above fees is enclosed.b. X Please charge my Deposit Account No. 50-0698 in the amount of \$ 930 to cover the above feesc. X The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
overpayment to Deposit Account No. 50-0698. A duplicate copy of this sheet is enclosed.**NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b))
must be filed and granted to restore the application to pending status.**

Please send all correspondence

by AIRMAIL
to:Dr. Paul J. Vincent
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Fed. Rep. of Germany

SIGNATURE:

Dr. Paul J. Vincent

NAME

37,461

REGISTRATION NUMBER

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: WEIHRAUCH, Georg) Examiner:
PCT Application No.: PCT/EP00/05985) unknown
PCT Filing Date: June 28, 2000) Art Unit:
For: METHOD FOR THE PRODUCTION) unknown
OF BRISTLES)

Docket No.: 18899.8

Assistant Commissioner for Patents
Washington, DC 20231
U.S.A.

PRELIMINARY AMENDMENT

Dear Sir:

Please enter this amendment prior to calculation of the
filing fees. This amendment is based on the translation of
the application **as amended on June 29, 2001.**

IN THE SPECIFICATION:

On page 1, insert as a title prior to the first paragraph --
BACKGROUND OF THE INVENTION --.

On page 3, insert as a title prior to the third paragraph --

1004344-1

SUMMARY OF THE INVENTION --.

On page 8 insert as a title prior to the brief description of the drawings --

BRIEF DESCRIPTION OF THE DRAWING --.

On page 8 insert as a title following the brief description of the drawing --

DESCRIPTION OF THE PREFERRED EMBODIMENT --.

On page 12, line 1, replace as a title "Claims" with --
I CLAIM: --.

IN THE CLAIMS:

Please delete **PCT amended claims 1 - 14** without prejudice and enter new claims 15 - 28 as indicated below:

15. A method for producing bristles through extrusion and drawing, the bristles having a core of at least one strand and a jacket of thermoplastic material, the materials of the core and the jacket having different technical and physical properties, the method comprising the steps of:

- a) supplying a colored, pre-fabricated core of endless material having a length reserve to an extrusion device;
- b) extruding, in said extrusion device, a jacket made from a transparent thermoplastic onto said running core; and
- c) drawing, following steps a) and b), said extruded jacket with said core to exhaust at least part of said length reserve.

- 16. The method of claim 15, wherein said core is supplied as an endless material having a high drawing capacity.
- 17. The method of claim 15, wherein said endless material of said core is supplied as at least one non-linear monofilament.
- 18. The method of claim 15, wherein said core is supplied as at least one plastic monofilament which is not fully stretched.
- 19. The method of claim 15, wherein said endless material of said core is supplied in at least one of wavy, compressed, and spiralled form.


20. The method of claim 15, wherein said endless material of said core is supplied in at least one of a plaited, knitted, and woven form.
21. The method of claim 15, wherein all of said length reserve is exhausted during drawing of said jacket in step c).
22. The method of claim 15, wherein said core is supplied as endless material having cross-sectional weakenings.
23. The method of claim 15, wherein said core is supplied as endless material having equally spaced cross-sectional weakenings.
24. The method of claim 15, wherein step c) comprises the step of drawing said endless material of said core to break several times, thereby exhausting said length reserve.
25. The method of claim 15, further comprising the step of providing said endless material of said core with at least one of chemically, physically, hygienically and medically effective substances, prior to step a).

26. The method of claim 15, wherein said core is supplied as an endless material having at least one of direct medical and direct hygienic effect.
27. The method of claim 15, wherein said core is supplied as said endless material consisting essentially of one of metal wire and metallized plastic material.
28. The method of claim 15, wherein said core is supplied as said endless material consisting essentially of one of parallel twisted and turned monofilaments.

REMARKS

The amendments have been taken to adapt this application to United States practice. No new matter has been added.

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ART 34 AMDT

18899.8

Translation of PCT/EP00/05985 as amended on June 29, 2001

Method for the Production of Bristles

The invention concerns a method for producing bristles through extrusion and drawing, wherein the bristles consist of a core having at least one strand and a jacket of thermoplastic material, and the core and jacket materials have different technical, physical properties.

Plastic bristles are usually produced through extrusion or spinning as endless monofilaments. The monofilaments or monofilaments combined into strands are then cut to length. Plastic bristles are also known which consist of a core and a jacket for utilizing different material properties or, with a transparent jacket, different optical properties, e.g. for wear display (DE 34 00 941 A1, US 3 258 805 A1, EP 0 303 202).

In the event that the jacket and core consist of thermoplastic materials, they can be produced through co-extrusion of the two plastic materials (GB 2 050 156, WO 94/10 539). The endless material obtained in this fashion must be drawn directly during extrusion in the still soft-plastic state and be drawn again after sufficient cooling to provide the material with the required bending strength with simultaneous sufficient elasticity through molecular orientation. Since the two plastic materials have, as

desired, different properties, their behavior during drawing also differs. This necessitates compromises with respect to the material properties of the finished product.

In another conventional method (WO96/30 567A1), in particular for the manufacture of fishing lines, a jacket of thermoplastic polymer is extruded onto a multiple-filament core. The multiple-filament core is preferably twisted and is drawn during extrusion of the jacket. The core material is subsequently re-drawn and simultaneously cooled to generate a strong molecular orientation of the core material. Although not stated, the jacket material is presumably also thereby drawn. The jacket and core are made from thermoplastic polymers having differing melting temperatures. The primary goal is to produce an abrasion resistant composite material of high tensile strength, with the tensile strength being substantially determined by the core material and the abrasion resistance by the jacket material.

US 4,297,413 discloses coating a core monofilament having some molecular orientation through extrusion of a jacket made from a non-oriented polymer. The composite material is subsequently drawn to optimize the molecular orientation of the core and simultaneously orient the jacket material. This method is also primarily intended for fishing lines.

GB 2 050 156 A1 discloses discontinuous supply of the plastic material for the core during extrusion and continuous supply of the plastic material for the jacket to produce an endless

material in which separated core sections are embedded. The jacket is constricted between each of the core sections. The endless material is separated in the region of the constrictions to produce individual bristles with one core each whose two ends are covered by the jacket material. This method could be reasonable for the production of bristles, however, turns out to not actually work. The 1.5 to 10 fold drawing, in each of the two drawing steps, which is absolutely necessary after extrusion, causes premature tearing of the jacket material at the constrictions. Since the tensile forces cannot be transferred to the core material, it is inevitably not molecularly oriented and is consequently absolutely unsuitable for bristles.

It is the underlying purpose of the invention to propose a method for producing bristle material wherein the jacket provides the physical, technical properties to be met by the bristle and the core can have arbitrary characteristics, wherein, in particular, the characteristics of intended use of the finished bristle should be visible.

This object is achieved in accordance with the invention in that the core is supplied as a colored, pre-fabricated endless material with a length reserve and the jacket, made from a thermoplastic, transparent plastic, is extruded onto the running core and, during subsequent drawing of the jacket, at least part of the length reserve of the core is exhausted.

The pre-fabrication of the endless material for the core and its supply for subsequent extrusion of the plastic material for the jacket allows the core to have almost any properties through corresponding material selection or through the type and construction of the endless material. During thermal drawing directly after extrusion and also during subsequent cold or thermal drawing of the jacket, the jacket is provided with the properties required for bristles, with respect to bending strength and restoring capacity, while the endless material of the core can track the drawing process through utilization of the length reserve and is optionally given its final and desired properties only then. In contrast to co-extrusion where both materials must be processed in the molten state, the inventive method permits use of materials for the core which cannot be processed in the molten state or at least not together with the jacket material. These could be materials which are intrinsically temperature-sensitive or which contain temperature-sensitive additives since the contact with the molten polymer mass of the jacket is only temporary and the jacket cools more rapidly since its cross-section is smaller than that of a monofilament. The transparency of the jacket and the coloring of the core permit visualisation of certain properties or intended uses of the bristles of the finished brushware. Moreover, the method can be used to provide an indication of wear of the bristle, wherein the core material is exposed with increasing wear so that the colored core becomes recognizable or more intense.

The length reserve of the endless material for the core can be realized in different ways. The core can e.g. be supplied in the form of an endless material having a high drawing capacity. In particular, materials having rubber-like properties are suitable which produce some kind of pre-tension in the bristle after drawing and cooling. This provides the bristle, having a relatively stiff material compared to the core, with particularly good bending properties.

Alternatively, the endless material of the core can be supplied in the form of at least one non-linear monofilament, wherein the length reserve is partially or completely exhausted through drawing of the monofilament into an approximately linear shape.

It is also possible to supply the endless material of the core in a wavy, compressed or spiral shape and obtain the length reserve from the waves, compression or spiral. If the length reserve is only partially utilized, the remaining waves, compressions or spirals map onto the jacket if it is extruded in close contact with the endless material of the core. This produces bristles having a profiled surface with improved cleaning action.

Moreover, the endless material of the core can be supplied in plaited, knitted or drawn form, wherein, during drawing of the jacket, the endless material of the core is correspondingly drawn. Finally, the core can be supplied in

the form of at least one plastic monofilament which is not or which is only partially drawn, i.e. which has sufficient length reserve to be drawn together with the jacket.

When drawing the jacket, the entire length reserve can be utilized. Towards this end, the construction and material selected for the endless material must be matched to the plastic material of the jacket and to the required degree of drawing.

The core can also be supplied as endless material having cross-sectional weakenings, wherein these cross-sectional weakenings are preferably disposed at equal distances. During drawing of the jacket, the endless material of the core can be multiply overdrawn after exhausting of the length reserve such that the core in the finished bristle material is present in interrupted sections, wherein the jacket does not tear during drawing, as is the case in the above description of prior art. If the cross-sectional weakenings on the endless material of the core are provided at equal distances, the separations can be matched, in particular, to the bristle length such that each bristle comprises at least one core section and the core material is covered at both ends by the jacket material.

The invention also allows the endless material of the core to be initially provided with chemical, physical, hygienic or medically active additives which are then covered by the jacket after extrusion thereof. The plastic material of the

jacket can thereby be selected such that these additives diffuse into the jacket without any further measures or through the effect of moisture, and diffuse from same again into the surroundings. This is recommended e.g. with medically or hygienically effective additives when the bristles are used for tooth brushes. Although some conventional bristle materials contain such additives, they are either directly embedded into the monofilament or disposed on the surface. Direct embedding is not possible for additives, since they are temperature sensitive and would be damaged during extrusion. This danger does not exist for the inventive method. Control of the delivery of such additives during use is facilitated by the selection of the jacket material.

The core can also be supplied in the form of an endless material with direct medical or hygienic effect. This is in particular the case for metallic ionogenic substances such as silver or silver compounds with known antibacterial effect. Although they are conventionally embedded into monofilaments, this produces an unsightly grey color.

The core can also be supplied in the form of an endless material of metal wire or metallized plastic material thereby possibly using ionogenic properties or other properties of metals.

Finally, the core can be supplied in the form of an endless material of parallel, twisted or turned monofilaments which

provide a certain length reserve and which also have a high tensile strength due to their twisted or turned shape.

The method in accordance with the invention is described below with reference to embodiments of devices shown in the drawing.

Fig. 1 shows a schematic view of an embodiment of an extruder for carrying out the method;

Fig. 2 shows an enlarged sectional view of a first embodiment in the region of the extrusion nozzle; and

Fig. 3 shows a sectional view corresponding to Fig. 2 of a further embodiment.

Fig. 1 shows a conventional extruder 1 comprising a substructure 2, the actual extruder casing 3 and a delivery funnel 4 for a granulated polymer matter for the jacket of the bristle material to be produced. The extruder nozzle 4 of the extruder 1 is directly followed by a shaping head 5 in which the extruded matter leaving the extruder nozzle 4 is deflected upwardly at an angle - in the embodiment shown, of 90°. Endless material 6 is supplied from below into the shaping head 5 for forming the core of the bristle material. The endless material can, of course, also be supplied from the top towards the bottom. The extruded matter can also exit vertically and be deflected into the horizontal direction to

permit horizontal guidance of the endless strand. A composite strand 7 exits from the top of the shaping head 5 comprising the inner endless material 6 having a length reserve and the extruded matter which exits from the nozzle 4.

A device 8 comprising galettes which simultaneously draw the extruded matter forming the jacket during removal, is used to remove the composite strand 7. The device 8 which can optionally consist of a series of several galettes, one behind the other, can be followed by a further device for cold or thermal drawing.

In the embodiment of Fig. 2, the extruder nozzle 4 has a tapering cross-section 9 through which the still soft-molten extruded matter 10 exits as massive monofilament. The shaping head 5 comprises a shaping channel 11 which bends through 90° in the upward direction and into which the extruded matter is deflected. The shaping head 5 also comprises a guide channel 12 which is disposed in the shaping head downstream of the extrusion nozzle 4 and terminates in the region of the deflection 13 into the guide channel 11. The endless material 6 is supplied through the shaping channel 12 whose length reserve is indicated by the wavy lines. It can be a pure length reserve or a drawing reserve.

The endless material 6 enters on the axis of the shaping channel 11 and is thereby completely surrounded by the extruded matter. This is effected by the device 8 which simultaneously withdraws the extruded matter 14 for the

bristle jacket from the guide channel 11 along with the endless material 6 for the bristle core. The cross-section of the extruded matter 14 thereby tapers by a predetermined amount directly after leaving the shaping head 5 into the composite strand 7 and at least part of the length reserve of the endless material 6 is simultaneously exhausted, as shown in the figure. The jacket 20 covers the core 21 in the composite strand 7 in material locking and/or positive locking fashion.

In the embodiment of Fig. 3, the extrusion nozzle 4 is formed as an annular nozzle 15 whose inner diameter 16 is greater than the largest dimension of the endless material 6 in a direction transverse to its longitudinal extension. The shaping channel 11 has an inner diameter which corresponds approximately to the outer diameter of the annular extrusion nozzle 15 such that the still soft-molten extruded matter which leaves the extruder is formed as a capillary monofilament 17. The endless material 6 supplied via the guiding channel 12 is again axially drawn into the shaping channel 11 and enters the capillary space of the monofilament 17 for forming the composite strand 7 comprising the jacket 20 and the core 21. When removing and drawing the composite strand 7, the jacket of the capillary monofilament 17 initially seats on the endless material 6. At this location, the plastic material is still soft and the endless material 6 is therefore only covered on the outside. Appropriate constructive dimensioning and adjustment of the removal force of the device 8 produces a relatively regular seating of the

jacket 20 on the core 21 such that the core is either fixed in the jacket or is still axially displaceable with respect thereto to permit e.g. partial withdrawal of the core of the finished bristle and use thereof for the brushing action of the brushware produced therefrom.

Claims

1. Method for producing bristles through extrusion and drawing, wherein the bristles consist of a core having at least one strand and a jacket of thermoplastic material, wherein the materials of the core and the jacket have different technical and physical properties, characterized in that the core is supplied as colored, pre-fabricated endless material having a length reserve and the jacket, made from a transparent thermoplastic plastic, is extruded onto the running core, wherein at least part of the length reserve of the core is exhausted during subsequent drawing of the jacket.
2. Method according to claim 1, characterized in that the core is supplied in the form of an endless material having a high drawing capacity.
3. Method according to claim 1 or 2, characterized in that the endless material of the core is supplied in the form of at least one non-linear monofilament.
4. Method according to any one of the claims 1 through 3, characterized in that the core is supplied in the form of at least one plastic monofilament which is not or which is only partially stretched.

5. Method according to any one of the claims 1 through 3, characterized in that the endless material of the core is supplied in a wavy, compressed or spiralled form.
6. Method according to any one of the claims 1 through 3, characterized in that the endless material of the core is supplied in a plaited, knitted or woven form.
7. Method according to any one of the claims 1 through 6, characterized in that the entire length reserve is exhausted during drawing of the jacket.
8. Method according to any one of the claims 1 through 7, characterized in that the core is supplied as endless material with cross-sectional weakenings.
9. Method according to any one of the claims 1 through 8, characterized in that the core is supplied as endless material with cross-sectional weakenings at equal distances.
10. Method according to any one of the claims 1 through 9, characterized in that the endless material of the core is drawn to break several times during drawing of the jacket, thereby exhausting the length reserve.
11. Method according to any one of the claims 1 through 10, characterized in that the endless material of the core is provided with chemically, physically,

hygienically or medically effective substances before being supplied.

12. Method according to any one of the claims 1 through 10, characterized in that the core is supplied in the form of an endless material with direct medical or hygienic effect.
13. Method according to any one of the claims 1 through 12, characterized in that the core is supplied in the form of an endless material of metal wire or metallized plastic material.
14. Method according to any one of the claims 1 through 13, characterized in that the core is supplied in the form of an endless material of parallel twisted or turned monofilaments.

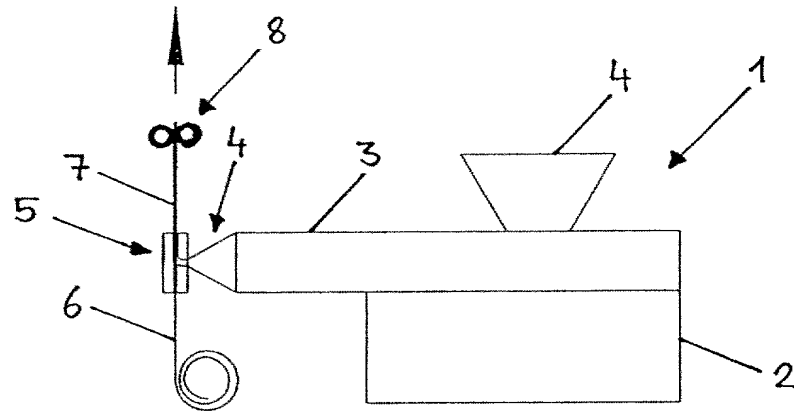


Fig. 1

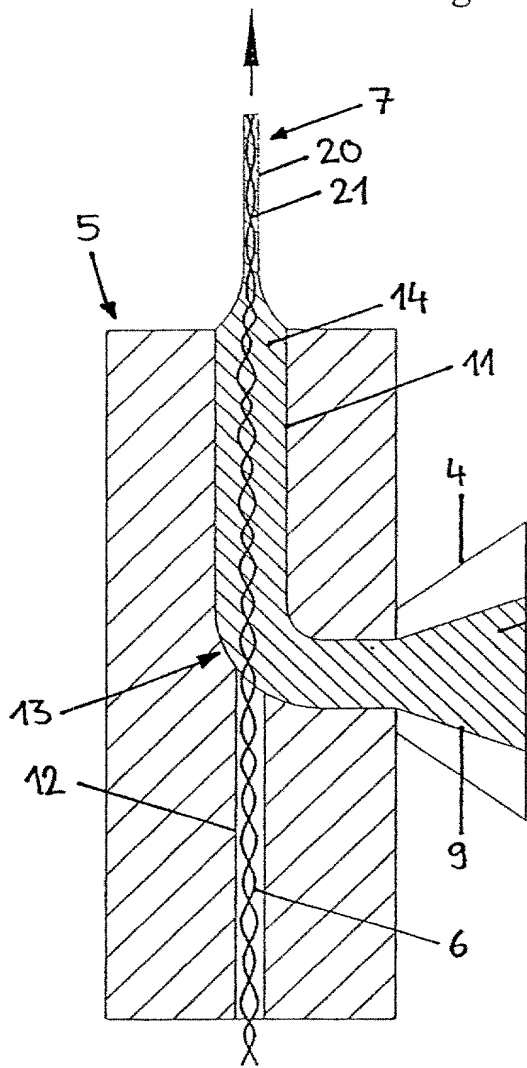


Fig. 2

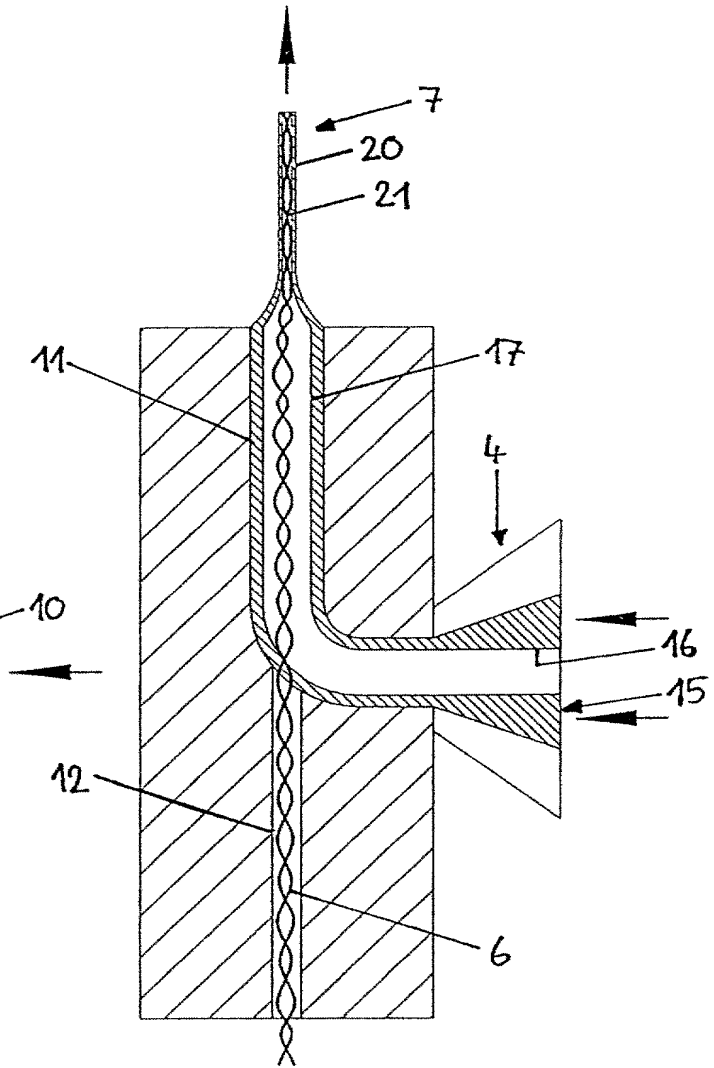


Fig. 3

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY

(Includes Reference to PCT International Applications)

ATTORNEY DOCKET NUMBER

18899.8

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Method and device for the production of bristles

the specification of which (check only one item below):

☐ is attached hereto.

☐ was filed as United States application

Serial No. _____

on _____

and was amended

on _____ (if applicable)

☒ was filed as PCT international application

Number PCT/EP00/05985

on June 28, 2000

and was amended under PCT Article 19

on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is known to me or other person(s) involved in the preparation or prosecution of this application to be material to the examination of this application and to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby authorize the U.S. attorney or agent named herein to accept and follow instructions from _____

as to any action taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney or agent and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorney or agent named herein will be so notified by the undersigned.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119

COUNTRY (if PCT, indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119	
Germany	199 31 993.6	09. July 1999	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO

Combined Declaration For Patent Application and Power of Attorney (Continued)

(Includes Reference to PCT International Applications)

ATTORNEY DOCKET NUMBER

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. BENEFIT UNDER 35 U.S.C. 120

U.S. APPLICATIONS

STATUS (Check one)

U.S. APPLICATION NUMBER

U.S. FILING DATE

PATENTED

PENDING

ABANDONED

PCT APPLICATIONS DESIGNATING THE U.S.

PCT APPLICATION NUMBER

PCT FILING DATE

U.S. SERIAL NUMBERS
ASSIGNED (if any)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (List name and registration number)

(1) Paul J. Vincent Reg No 37 461

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201	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY
202	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY
203	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY

I hereby declare under penalty of perjury under the laws of the United States of America that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine and imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon

SIGNATURE OF INVENTOR 201

SIGNATURE OF INVENTOR 202

SIGNATURE OF INVENTOR 203

DATE

Dec. 17, 2001

DATE

DATE